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UNITED STATES ARMY

HEALTH CARE STUDIES AND
CLINICAL INVESTIGATION ACTIVITY



Post Anesthesia Care Unit Patient Classification System:
The Direct Care Nursing Time Component
Executive Summary

Conducted by U.S. Army Health Services Command
U.S. Army Health Care Studies and Clinical
Investigation Activity, Nursing Studies Branch

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The intent of the study was to quantify the time Post Anesthesia Care Unit (PACU) nurses spend in direct patient care (i.e., that care provided in the presence of the patient). The quantified PACU direct care time would provide one critical component necessary for the development of an acuity based Patient Classification System (PCS). The study was conducted in three broad phases over a period of two years. Phase I, a panel of clinical nursing experts identified 62 direct care nursing tasks that reflected the full range of PACU nursing. The average time (mean time) to complete each of the 62 direct care tasks was established by actual stopwatch timed measurements. In Phase II a PACU data collection instrument was developed that contained the 62 PACU direct care tasks. A pilot test of this 62 task instrument revealed a reliability of r .93 and a validity of r .82. A field study was initiated at six Army Medical Treatment Facilities (MTFs) with 4018 data collection instruments completed over a period of 14 weeks. Analysis of the data revealed three naturally occurring patient acuity categories (category I 0-29 min, category II 30-69 min, and category III 70 min or greater). Regression analysis identified 25 tasks as the fewest best set of direct care predictor tasks.				
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In phase III a panel of PACU clinical nursing experts modified the format of the instrument to enhance clarity, conciseness and ease of use. A two week clinical study of this 25 task instrument was undertaken to assess clarity, conciseness and ease of use. A large majority or 97.6% of the clinical staff reported that the instrument was easy to use and 93.3% noted it was concise and clear. Evaluation of the psychometric parameters of this modified 25 task instrument revealed a reliability of r .98 and a validity of r .90. .

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BACKGROUND

The Army Nurse Corps (ANC), recognizing the need to objectively identify the required nursing resources, use a Patient Classification System (PCS) called the Workload Management System for Nursing (WMSN). The WMSN is an acuity based PCS that covers six inpatient clinical areas, but not the Post Anesthesia Care Unit (PACU). The PACU presented special needs that could not be captured by the WMSN instrument. Not having a PCS for the PACU created a problem with determining total nurse staffing requirements. To fill this void the Army Medical Department (AMEDD) Study Board tasked the Health Care Studies and Clinical Investigation Activity (HCSCIA) to extend the WMSN into the Post Anesthesia Care Unit (PACU). After the study had commenced, the office of the Assistant Secretary of Defense (Health Affairs) (OASD[HA]) decided to use the PACU study results in the triservice arena. In addition, the data would be used as one element in the development of the triservice manpower staffing standard for PACU.

The PCS to be developed for PACU needed to have equivalent properties of the WMSNs, be reliable, valid, and easy to use. The PCSs (PACU) reviewed, were evaluated on five criteria to assess each instrument's approximate fit to the WMSN. None of the PCSs reviewed satisfied all the criteria. Therefore, it was decided to develop a new factor evaluative PCS for PACU that would have methodological consistency, objectivity, and articulate well with the existing WMSN.

PURPOSE

The intent of the study was to quantify the time PACU nurses spend in direct care (i.e., that care provided in the presence of the patient). The quantified PACU direct care times would provide a critical component necessary in the development of a patient acuity based PCS for PACU.

STUDY OBJECTIVES

The study was designed to achieve eight objectives divided into three phases:

Phase I

1. Identify the full range of tasks relevant to PACU nursing practice;
2. Measure newly identified PACU nursing tasks;
3. Derive mean times for all direct care PACU tasks;

Phase II

4. Develop a valid and reliable instrument to capture direct care time;

5. Determine acuity categories relevant to PACU;
6. Reduce the number of tasks to the fewest and best set of predictors tasks for total direct care time;

Phase III

7. Revise and test the modified instrument in the clinical area for ease of use;
8. Assess the validity and reliability of the modified instrument.

METHODOLOGY

The study was conducted in three broad phases over a period of two years. Phase I addressed the development of a direct care nursing task list and the establishment of mean tasking time for each direct care tasks. Two panels of clinical nursing experts developed a list of relevant PACU nursing tasks that reflected the full range of PACU nursing. Those tasks requiring timed measurement, were timed with stopwatches at Army Medical Treatment Facilities (MTFs).

Phase II was aimed at constructing a model data collection instrument and ascertaining the reliability and validity of the instrument. Establishment of the instrument's reliability and validity was done with a **pilot test** of the data collection instrument at one moderately busy Army MTF. Following verification of reliability (r .93) and validity (r .82), a **field test** of the model instrument was initiated to establish patient acuity categories and to reduce the original number of tasks to an optimal parsimonious set of predictors of total direct care time.

Phase III of the study focused on three parts. First, a panel of clinical nursing experts formatted the instrument and evaluated the user instructions. Second, the PACU clinical staffs from the six data collection sites used the revised instrument for two weeks and critiqued its clarity and ease of use. The final part of phase III was reevaluation of the instrument's reliability and validity.

FINDINGS

Phase I

This phase of the study replicated the approach used by Sherrod, Rauch, and Twist (1981). The critical care and medical/surgical direct care nursing tasks from Sherrod et al. (1981) were reviewed by two panels of PACU nursing experts for their relevance to PACU nursing. They identified 76 tasks out of the 259 tasks reviewed as relevant to PACU. The panel also reviewed the operational definitions for appropriateness and clarity. The 76 direct care tasks selected include seven newly identified tasks with operational definitions. A number of the 76 tasks were integrated to form a new task

reflecting the integrated tasks. The final task list consisted of 62 individual and integrated nursing tasks. Only the seven newly identified tasks required timing with stopwatches at six moderate to heavy PACU workloads, Army Medical Treatment Facilities (MTFs). A data collection worksheet was utilized to capture a minimum of 30 observations per task, per site.

Before data collection began, interrater reliability of 85% was established for all data collectors. The data collectors were familiarized with the clinical setting, worksheets, stopwatches, and were taught to begin and end task timings according to operational definition of the task. If more than one nursing care provider was involved in completing a task, each of the providers was timed with a separate stopwatch. The total time used in the analysis was the sum of the time of all care providers involved with the timed task.

A total of 970 observations were obtained and used to identify the mean time for each of the timed tasks. Analysis of the data using analysis of variance (ANOVA) revealed no significant difference among sites for six of the seven timed tasks. A significant difference was noted among sites for the task, Admission to PACU. But when this task (Admission to PACU) was analyzed by type of anesthesia (General, Spinal/regional and Local/local with sedation), no significant difference was found among sites. The end result of this phase was the establishment of mean times for the 62 tasks representing the domain of PACU nursing practice.

Phase II

The overall goal for Phase II was the development of a reliable and valid data collection Instrument with the fewest best set of predictor tasks. A **pilot test** at one moderately busy MTF was used to evaluate the validity and reliability of the PACU instrument. Thirty-four patients were followed throughout their recovery in PACU. Before data collection started, interrater reliability of 85% was established for all data collectors. The staff completed a PACU data collection worksheet on each patient admitted. The researchers completed a worksheet on the same patient as the staff and used stopwatches to time each direct care task. Reliability ($r=.93$) was evaluated by comparing the staff's worksheet times and the researcher worksheet times. Validity ($r=.82$) was obtained by comparing the stopwatch times with the researcher worksheet times.

After determination of reliability and validity, a 14 week **field test** was initiated at six MTFs with moderate to high PACU workload. The PACU nursing staff was trained to use the data collection worksheet and to use the operational definitions to determine start and end time of task. Interrater reliability of 85% was established by using written patient scenarios before the study started and after the study had ended. During the 14 week data collection period, 4018 worksheets were completed with 1048 not being used in the analysis. The first two weeks of data (998 worksheets) were used only as a way to familiarize the staff with the worksheet and as a method for the researchers to identify problems with the worksheet. These 998 worksheets plus another 50 worksheets that were found to be incomplete or inaccurate were not used in the analysis. Therefore, a total of 2970 observations were used to

identify (three) acuity categories and identify the fewest best set of direct care predictor tasks (25). The following naturally occurring acuity categories were identified:

Category I = 0 to 29 minutes

Category II = 30 to 69 minutes

Category III = 70+ minutes

The sample (2970) was separated into two subsets by a computer generated random number program and a split-half cross validation procedure used to analyze the data. Regression Analysis of the Phase II data identified 25 tasks (variables) that were highly accurate ($r=.95$) in accounting for total direct care time and highly accurate ($r=.96$) in categorizing patients. The final instrument was developed using a regression technique yielding weighted times (beta coefficients) for the 25 tasks.

Phase III

In Phase III the 25 task instrument was evaluated for clinical ease of use and for reliability and validity. A panel (six) of PACU clinical experts reviewed the worksheet for clarity and ease of use. The clinical experts rearranged the 25 nursing tasks from most frequently occurring to least frequently occurring under four subheadings. Then for a period of two weeks the newly modified worksheet was used in the clinical area. The results of this two week clinical trial was an overwhelming majority of the nursing staff (97.6%) thought the organization of the worksheet made it easy to use. A large majority (93.3%) of the clinical staff thought the data collection instrument and user instructions were clear and concise.

Reliability and validity required reevaluation because of modification of the 62 task instrument to a 25 task instrument. A high reliability coefficient of $r=.98$ was found when the researcher time of the 62 task instrument was compared to the researcher time of the 25 task instrument. An excellent validity coefficient of $r=.90$ was obtained when the 25 task instrument time was compared to the 62 task instrument stopwatch time.

CONCLUSIONS

The results of this study denote a balance between scientific accuracy and clinical reality in the health care arena. This study accurately provides for the direct care component required to develop the PACU, PCS. The direct care component included 25 direct care task that is 96% accurate in categorizing the patient into one of three PACU patient acuity categories. The end product was an instrument that captured direct care nursing time with a high degree of accuracy in acuity categorization ($r=.96$) and in accounting for direct care time ($r=.95$). The clinical staff deemed the PACU instrument easy to use with clear, concise user instructions. Finally, the PACU instrument fell within the parameters of a Type I manpower staffing standard.